

## SEQUENCE LISTING

SEQ ID NO:1

***E. coli* expressed *P. falciparum* MSP1<sub>42</sub> (3D7)****Protein Sequence**

In Clone pET-Trx42

1 Met Ser Asp Lys Ile Ile His Leu Thr Asp  
11 Asp Ser Phe Asp Thr Asp Val Leu Lys Ala  
21 Asp Gly Ala Ile Leu Val Asp Phe Trp Ala  
31 Glu Trp Cys Gly Pro Ccy Lys Met Ile Ala  
41 Pro Ile Leu Asp Glu Ile Ala Asp Glu Tyr  
51 Gln Gly Lys Leu Thr Val Ala Lys Leu Asn  
61 Ile Asp Gln Asn Pro Gly Thr Ala Pro Lys  
71 Tyr Gly Ile Arg Gly Ile Pro Thr Leu Leu  
81 Leu Phe Lys Asn Gly Glu Val Ala Ala Thr  
91 Lys Val Gly Ala Leu Ser lys Gly Gln Leu  
101 Lys Glu Phe Leu Asp Ala Asn Leu Ala Gly  
111 Ser Gly Ser Gly His Met His His His His  
121 His His Ser Ser Gly Leu Val Pro Arg Gly  
131 Ser Gly Met Lys Glu Thr Ala Ala Ala Lys  
141 Phe Glu Arg Gln His Met Asp Ser Pro Asp  
151 Leu Gly Thr Asp Asp Asp Asp Lys Ala Met  
161 Ala Asp Ile Gly Ser Ile Glu Gly Arg Gly  
171 Thr Met Ala Ile Ser Val Thr Met Asp Asn  
181 Ile Leu Ser Gly Phe Glu Asn Glu Tyr Asp  
191 Val Ile Tyr Leu Lys Pro Leu Ala Gly Val  
201 Tyr Arg Ser Leu Lys Lys Gln Ile Glu Lys  
211 Asn Ile Phe Thr Phe Asn Leu Asn Leu Asn  
221 Asp Ile Leu Asn Ser Arg Leu Lys Lys Arg

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231 Lys Tyr Phe Leu Asp Val Leu Glu Ser Asp  
241 Leu Met Gln Phe Lys His Ile Ser Ser Asn  
251 Glu Tyr Ile Ile Glu Asp Ser Phe Lys Leu  
261 Leu Asn Ser Glu Gln Lys Asn Thr Leu Leu  
271 Lys Ser Tyr Lys Tyr Ile Lys Glu Ser Val  
281 Glu Asn Asp Ile Lys Phe Ala Gln Glu Gly  
291 Ile Ser Tyr Tyr Glu Lys Val Leu Ala Lys  
301 Tyr Lys Asp Asp Leu Glu Ser Ile Lys Lys  
311 Val Ile Lys Glu Glu Lys Glu Lys Phe Pro  
321 Ser Ser Pro Pro Thr Thr Pro Pro Ser Pro  
331 Ala Lys Thr Asp Glu Gln Lys Lys Glu Ser  
341 Lys Phe Leu Pro Phe Leu Thr Asn Ile Glu  
351 Thr Leu Tyr Asn Asn Leu Val Asn Lys Ile  
361 Asp Asp Tyr Leu Ile Asn Leu Lys Ala Lys  
371 Ile Asn Asp Cys Asn Val Glu Lys Asp Glu  
381 Ala His Val Lys Ile Thr Lys Leu Ser Asp  
391 Leu Lys Ala Ile Asp Asp Lys Ile Asp Leu  
401 Phe Lys Asn Pro Tyr Asp Phe Glu Ala Ile  
411 Lys Lys Leu Ile Asn Asp Asp Thr Lys Lys  
421 Asp Met Leu Gly Lys Leu Leu Ser Thr Gly  
431 Leu Val Gln Asn Phe Pro Asn Thr Ile Ile  
441 Ser Lys Leu Ile Glu Gly Lys Phe Gln Asp  
451 Met Leu Asn Ile Ser Gln His Gln Cys Val  
461 Lys Lys Gln Cys Pro Glu Asn Ser Gly Cys  
471 Phe Arg His Leu Asp Glu Arg Glu Glu Cys  
481 Lys Cys Leu Leu Asn Tyr Lys Gln Glu Gly  
491 Asp Lys Cys Val Glu Asn Pro Asn Pro Thr

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501 Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala  
 511 Asp Ala Thr Cys Thr Glu Glu Asp Ser Gly  
 521 Ser Ser Arg Lys Lys Ile Thr Cys Glu Cys  
 531 Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp  
 541 Gly Ile Phe Cys Ser Ser \*

**SEQ ID NO:2**

*E. coli* expressed *P. falciparum* MSP1<sub>42</sub> (3D7) Protein  
 Sequence

In Clone pET(50)MSP1-42

1 Met His His His His His His Ser Ser Gly  
 11 Leu Val Pro Arg Gly Ser Gly Met Lys Glu  
 21 Thr Ala Ala Ala Lys Phe Glu Arg Gln His  
 31 Met Asp Ser Pro Asp Leu Gly Thr Asp Asp  
 41 Asp Asp Lys Ala Met Ala Asp Ile Gly Ser  
 51 Ile Glu Gly Arg Gly Thr Met Ala Ile Ser  
 61 Val Thr Met Asp Asn Ile Leu Ser Gly Phe  
 71 Glu Asn Glu Tyr Asp Val Ile Tyr Leu Lys  
 81 Pro Leu Ala Gly Val Tyr Arg Ser Leu Lys  
 91 Lys Gln Ile Glu Lys Asn Ile Phe Thr Phe  
 101 Asn Leu Asn Leu Asn Asp Ile Leu Asn Ser  
 111 Arg Leu Lys Lys Arg Lys Tyr Phe Leu Asp  
 121 Val Leu Glu Ser Asp Leu Met Gln Phe Lys  
 131 His Ile Ser Ser Asn Glu Tyr Ile Ile Glu  
 141 Asp Ser Phe Lys Leu Leu Asn Ser Glu Gln  
 151 Lys Asn Thr Leu Leu Lys Ser Tyr Lys Tyr  
 161 Ile Lys Glu Ser Val Glu Asn Asp Ile Lys

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171 Phe Ala Gln Glu Gly Ile Ser Tyr Tyr Glu  
 181 Lys Val Leu Ala Lys Tyr Lys Asp Asp Leu  
 191 Glu Ser Ile Lys Lys Val Ile Lys Glu Glu  
 201 Lys Glu Lys Phe Pro Ser Ser Pro Pro Thr  
 211 Thr Pro Pro Ser Pro Ala Lys Thr Asp Glu  
 212 Gln Lys Lys Glu Ser Lys Phe Leu Pro Phe  
 231 Leu Thr Asn Ile Glu Thr Leu Tyr Asn Asn  
 241 Leu Val Asn Lys Ile Asp Asp Tyr Leu Ile  
 251 Asn Leu Lys Ala Lys Ile Asn Asp Cys Asn  
 261 Val Glu Lys Asp Glu Ala His Val Lys Ile  
 271 Thr Lys Leu Ser Asp Leu Lys Ala Ile Asp  
 281 Asp Lys Ile Asp Leu Phe Lys Asn Pro Tyr  
 291 Asp Phe Glu Ala Ile Lys Lys Leu Ile Asn  
 301 Asp Asp Thr Lys Lys Asp Met Leu Gly Lys  
 311 Leu Leu Ser Thr Gly Leu Val Gln Asn Phe  
 321 Pro Asn Thr Ile Ile Ser Lys Leu Ile Glu  
 331 Gly Lys Phe Gln Asp Met Leu Asn Ile Ser  
 341 Gln His Gln Cys Val Lys Lys Gln Cys Pro  
 351 Glu Asn Ser Gly Cys Phe Arg His Leu Asp  
 361 Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn  
 371 Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu  
 381 Asn Pro Asn Pro Thr Cys Asn Glu Asn Asn  
 391 Gly Gly Cys Asp Ala Asp Ala Thr Cys Thr  
 401 Glu Glu Asp Ser Gly Ser Ser Arg Lys Lys  
 411 Ile Thr Cys Glu Cys Thr Lys Pro Asp Ser  
 421 Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
 431 Ser \*

171 181 191 201 211 212 231 241 251 261 271 281 291 301 311 321 331 341 351 361 371 381 391 401 411 421 431

SEQ ID NO:3

***E. coli* expressed *P. falciparum* MSP1<sub>42</sub> (3D7)  
Protein Sequence**

In Clone pET42A

(This plasmid codes for the same peptide sequence as that  
expressed in pET-IEGR-MSP1-42(AT))

1 Met Ala His His His His His His Pro Gly  
11 Gly Ser Ile Glu Gly Arg Gly Thr Met Ala  
21 Ile Ser Val Thr Met Asp Asn Ile Leu Ser  
31 Gly Phe Glu Asn Glu Tyr Asp Val Ile Tyr  
41 Leu Lys Pro Leu Ala Gly Val Tyr Arg Ser  
51 Leu Lys Lys Gln Ile Glu Lys Asn Ile Phe  
61 Thr Phe Asn Leu Asn Leu Asn Asp Ile Leu  
71 Asn Ser Arg Leu Lys Lys Arg Lys Tyr Phe  
81 Leu Asp Val Leu Glu Ser Asp Leu Met Gln  
91 Phe Lys His Ile Ser Ser Asn Glu Tyr Ile  
101 Ile Glu Asp Ser Phe Lys Leu Leu Asn Ser  
111 Glu Gln Lys Asn Thr Leu Leu Lys Ser Tyr  
121 Lys Tyr Ile Lys Glu Ser Val Glu Asn Asp  
131 Ile Lys Phe Ala Gln Glu Gly Ile Ser Tyr  
141 Tyr Glu Lys Val Leu Ala Lys Tyr Lys Asp  
151 Asp Leu Glu Ser Ile Lys Lys Val Ile Lys  
161 Glu Glu Lys Glu Lys Phe Pro Ser Ser Pro  
171 Pro Thr Thr Pro Pro Ser Pro Ala Lys Thr  
181 Asp Glu Gln Lys Lys Glu Ser Lys Phe Leu  
191 Pro Phe Leu Thr Asn Ile Glu Thr Leu Tyr  
201 Asn Asn Leu Val Asn Lys Ile Asp Asp Tyr  
211 Leu Ile Asn Leu Lys Ala Lys Ile Asn Asp

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221 Cys Asn Val Glu Lys Asp Glu Ala His Val  
 231 Lys Ile Thr Lys Leu Ser Asp Leu Lys Ala  
 241 Ile Asp Asp Lys Ile Asp Leu Phe Lys Asn  
 251 Pro Tyr Asp Phe Glu Ala Ile Lys Lys Leu  
 261 Ile Asn Asp Asp Thr Lys Lys Asp Met Leu  
 271 Gly Lys Leu Leu Ser Thr Gly Leu Val Gln  
 281 Asn Phe Pro Asn Thr Ile Ile Ser Lys Leu  
 291 Ile Glu Gly Lys Phe Gln Asp Met Leu Asn  
 301 Ile Ser Gln His Gln Cys Val Lys Lys Gln  
 311 Cys Pro Glu Asn Ser Gly Cys Phe Arg His  
 321 Leu Asp Glu Arg Glu Glu Cys Lys Cys Leu  
 331 Leu Asn Tyr Lys Lys Gln Glu Gly Asp Lys Cys  
 341 Val Glu Asn Pro Asn Pro Thr Cys Asn Glu  
 351 Asn Asn Gly Gly Cys Asp Ala Asp Ala Thr  
 361 Cys Thr Glu Glu Asp Ser Gly Ser Ser Arg  
 371 Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro  
 381 Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe  
 391 Cys Ser Ser \*

SEQ ID NO:4

Nucleotide Sequence of MSP1-<sub>42</sub> (3D7) in pMBP

1

ggtaccatgg caatatctgt cacaatggat aatatacctct caggatttga  
 aatgaatat gatgttatat  
 atttaaaacc

81

tttagctgga gtatatagaa gcttaaaaaa acaaattgaa aaaaacattt  
 ttacatttaa tttaaatttg  
 aacgatatct

161

taaattcacg tcttaagaaa cgaaaatatt tcttagatgt attagaatct  
 gatttaatgc aatttaaaca  
 tatatacctca

aatgaataca ttattgaaga ttcatttaaa ttattgaatt cagaacaaaa  
aaacacactt ttaaaaagtt  
acaaatatat

aaaagaatca gtagaaaatg atatttaaatt tgcacaggaa ggtataagtt  
attatgaaaa gggttttagcg  
aaatataagg

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atgattttaga atcaattaaa aaagttatca aagaagaaaa ggagaagttc
ccatcatcac caccaacaac
acctcogtca
```

```
cagacaaaaa cagacgaaca aaagaaggaa agtaagtacc ttccattttt
aacaacatt gagaccttat
acaataactt
```

agttaataaa attgacgatt acttaattaa cttaaaggca aagattaacg  
attgtaatgt tgaaaaagat  
gaagcacatg

ttaaaataac taaacttagt gattttaaag caattgatga caaaatagat  
cttttttaaaa accctaccga  
cttcgaagca

attataaaat tgataaatga tgatacgaaa aaagatatgc ttggcaaatt  
acttagtaca ggattagtgc  
aaattttttcc

taataacaata atatcaaaat taattgaagg aaaattccaa gatatgttaa  
acatttcaca acaccaatgc  
gtaaaaaaac

aatgtccaga aaattctgga tgtttcagac atttagatga aagagaagaa  
tgtaaattgtt tattaaatta  
caaacaagaa

```
ggtgataaat gtgttgaaaa tccaaatcct acttgtaacg aaaataatgg
tggatgtgat gcagatgcca
catgtaccga
```

agaagattca ggtagcagca gaaagaaaat cacatgtgaa tgtactaaac  
ctgattctta tccacttttc

gatggtattt

1121

tctgcagttc ctaagtcgac

SEQ ID NO:5

Primary Structure of MSP-1<sub>42</sub> in pMBP

1 Gly Ser Ile Glu Gly Arg Gly Thr Met Ala  
11 Ile Ser Val Thr Met Asp Asn Ile Leu Ser  
21 Gly Phe Glu Asn Glu Tyr Asp Val Ile Tyr  
31 Leu Lys Pro Leu Ala Gly Val Tyr Arg Ser  
41 Leu Lys Lys Gln Ile Glu Lys Asn Ile Phe  
51 Thr Phe Asn Leu Asn Leu Asn Asp Ile Leu  
61 Asn Ser Arg Leu Lys Lys Arg Lys Tyr Phe  
71 Leu Asp Val Leu Glu Ser Asp Leu Met Gln  
81 Phe Lys His Ile Ser Ser Asn Glu Tyr Ile  
91 Ile Glu Asp Ser Phe Lys Leu Leu Asn Ser  
101 Glu Gln Lys Asn Thr Leu Leu Lys Ser Tyr  
111 Lys Tyr Ile Lys Glu Ser Val Glu Asn Asp  
121 Ile Lys Phe Ala Gln Glu Gly Ile Ser Tyr  
131 Tyr Glu Lys Val Leu Ala Lys Tyr Lys Asp  
141 Asp Leu Glu Ser Ile Lys Lys Val Ile Lys  
151 Glu Glu Lys Glu Lys Phe Pro Ser Ser Pro  
161 Pro Thr Thr Pro Pro Ser Pro Ala Lys Thr  
171 Asp Glu Gln Lys Lys Glu Ser Lys Phe Leu  
181 Pro Phe Leu Thr Asn Ile Glu Thr Leu Tyr  
191 Asn Asn Leu Val Asn Lys Ile Asp Asp Tyr  
201 Leu Ile Asn Leu Lys Ala Lys Ile Asn Asp  
211 Cys Asn Val Glu Lys Asp Glu Ala His Val



221 Lys Ile Thr Lys Leu Ser Asp Leu Lys Ala  
 231 Ile Asp Asp Lys Ile Asp Leu Phe Lys Asn  
 241 Pro Thr Asp Phe Glu Ala Ile Lys Lys Leu  
 251 Ile Asn Asp Asp Thr Lys Lys Asp Met Leu  
 261 Gly Lys Leu Leu Ser Thr Gly Leu Val Gln  
 271 Ile Phe Pro Asn Thr Ile Ile Ser Lys Leu  
 281 Ile Glu Gly Lys Phe Gln Asp Met Leu Asn  
 291 Ile Ser Gln His Gln Cys Val Lys Lys Gln  
 301 Cys Pro Glu Asn Ser Gly Cys Phe Arg His  
 311 Leu Asp Glu Arg Glu Glu Cys Lys Cys Leu  
 321 Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys  
 331 Val Glu Asn Pro Asn Pro Thr Cys Asn Glu  
 341 Asn Asn Gly Gly Cys Asp Ala Asp Ala Thr  
 351 Cys Thr Glu Glu Asp Ser Gly Ser Ser Arg  
 361 Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro  
 371 Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe  
 381 Cys Ser Ser

## SEQ ID NO:6

Nucleotide Sequence E. coli Expressed Recombinant P.  
falciparum MSP-1<sub>42</sub> (3D7)

1  
 atggcacacc atcatcatca tcatcccggg ggatccggtt ctggtaccat  
 ggcaatatct gtcacaatgg  
 ataatatcct

81  
 ctcaggattt gaaaatgaat atgatgttat atatttaaaa cctttagctg  
 gagtatatag aagcttaaaa  
 aaacaaatt

161  
 gaaaaaaaca tttttacatt taatttaaatt ttgaacgata tcttaaattc  
 acgtcttaag aaacgaaaat  
 atttcttaga

tgtattagaa tctgatttaat gcaatttaaa catatatacct caaatgaata  
cattattgaa  
gattcattta aattattgaa

```
ttcagaacaa aaaaacacac ttttaaaaag ttacaaatat ataaaagaat
cagtagaaaa tgatattaaa
tttgcacagg
```

aaggataag ttattatgaa aaggtttag cgaaatataa ggatgattta  
gaatcaatta aaaaagttat  
caaagaagaa

aaggagaagt tccatcatc accaccaaca acacctccgt caccagcaaa  
aacagacgaa caaaagaagg  
aaagtaagtt

ccttcattt ttaacaaaca ttgagacctt atacaataac ttagttaata  
aaattgacga ttacttaatt  
aacttaaagg

caaagattaa cgattgtaat gttgaaaaag atgaagcaca tgttaaaata  
actaaactta gtgattttaa  
agcaattgat

gacaaaatag atctttttaa aaacccttac gacttcgaag caattaaaaa  
attgataaat gatgatacga  
aaaaagatat

gcttggaacaa ttacttagta caggattagt tcaaaatttt cctaatacaa  
taatatcaaa attaattgaa  
ggaaaattcc

```
aagatatgtt aaacatttca caacaccaat gcgtaaaaaa acaatgtcca
gaaaattctg gatgtttcag
acatttagat
```

gaaagagaag aatgtaaatg tttattaaat tacaaacaag aagggtgataa  
atgtgttgaa aatccaaatc  
ctacttgtaa

cgaaaataat ggtggatgtg atgcagatgc cacatgtacc gaagaagatt  
caggtagcag cagaaagaaa

atcacatgtg

1121

aatgtactaa acctgattct tatccacttt tcgatggat tttctgcagt tcctaa

SEQ ID NO:7

E. coli expressed P. falciparum MSP-1<sub>42</sub> (3D7) Protein Sequence

1 Met Ala His His His His His His Pro Gly  
11 Gly Ser Gly Ser Gly Thr Met Ala Ile Ser  
21 Val Thr Met Asp Asn Ile Leu Ser Gly Phe  
31 Glu Asn Glu Tyr Asp Val Ile Tyr Leu Lys  
41 Pro Leu Ala Gly Val Tyr Arg Ser Leu Lys  
51 Lys Gln Ile Glu Lys Asn Ile Phe Thr Phe  
61 Asn Leu Asn Leu Asn Asp Ile Leu Asn Ser  
71 Arg Leu Lys Lys Arg Lys Tyr Phe Leu Asp  
81 Val Leu Glu Ser Asp Leu Met Gln Phe Lys  
91 His Ile Ser Ser Asn Glu Tyr Ile Ile Glu  
101 Asp Ser Phe Lys Leu Leu Asn Ser Glu Gln  
111 Lys Asn Thr Leu Leu Lys Ser Tyr Lys Tyr  
121 Ile Lys Glu Ser Val Glu Asn Asp Ile Lys  
131 Phe Ala Gln Glu Gly Ile Ser Tyr Tyr Glu  
141 Lys Val Leu Ala Lys Tyr Lys Asp Asp Leu  
151 Glu Ser Ile Lys Lys Val Ile Lys Glu Glu  
161 Lys Glu Lys Phe Pro Ser Ser Pro Pro Thr  
171 Thr Pro Pro Ser Pro Ala Lys Thr Asp Glu  
181 Gln Lys Lys Glu Ser Lys Phe Leu Pro Phe  
191 Leu Thr Asn Ile Glu Thr Leu Tyr Asn Asn  
201 Leu Val Asn Lys Ile Asp Asp Tyr Leu Ile  
211 Asn Leu Lys Ala Lys Ile Asn Asp Cys Asn  
221 Val Glu Lys Asp Glu Ala His Val Lys Ile

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231 Thr Lys Leu Ser Asp Leu Lys Ala Ile Asp  
241 Asp Lys Ile Asp Leu Phe Lys Asn Pro Tyr  
251 Asp Phe Glu Ala Ile Lys Lys Leu Ile Asn  
261 Asp Asp Thr Lys Lys Asp Met Leu Gly Lys  
271 Leu Leu Ser Thr Gly Leu Val Gln Asn Phe  
281 Pro Asn Thr Ile Ile Ser Lys Leu Ile Glu  
291 Gly Lys Phe Gln Asp Met Leu Asn Ile Ser  
301 Gln His Gln Cys Val Lys Lys Gln Cys Pro  
311 Glu Asn Ser Gly Cys Phe Arg His Leu Asp  
321 Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn  
331 Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu  
341 Asn Pro Asn Pro Thr Cys Asn Glu Asn Asn  
351 Gly Gly Cys Asp Ala Asp Ala Thr Cys Thr  
361 Glu Glu Asp Ser Gly Ser Ser Arg Lys Lys  
371 Ile Thr Cys Glu Cys Thr Lys Pro Asp Ser  
381 Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser  
391 Ser \*

SEQ ID NO:8

tcg tcg ttt tgt cgt ttt gtc gtt

SEQ ID NO:9

PCR of genomic DNA using the forward primer

GGGGATCCATTGAGGGTCGTGGTACCATGGC AATATCTGTCACAATGG

SEQ ID NO:10

The reverse primer

GTCGACTTAGGAACTGCAGAAAATACCGG

SEQ ID NO: 11

GGGCATATGGCACACCATCATCATCATCATCCCGGGGGATCCGAC

SEQ ID NO:12

GGGCATATGGCACACCATCATCATCATCATCCCGGGGGAT CCGGTTCTGGTACCGAC

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